UNION CARBIDE CORPORATION
Chemicals and Plastics
P. O. Box 180
Sistersville, West Virginia

July 16, 1971

JFB
DLB/GMO
FDB
OKC
DJD
RJD
GMF
BIF
REG
HPK
RLL
RJO/ARR
WCO
DHO
JBR
CER/CEP/JS/DMW
JVS
CFS
RLS
CES
WJS
DLV
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ENVIRONMENTAL PROTECTION

Month of June, 1971 - C. W. Shonnard

Technology and Projects

1. A six months review of plant waste loads, exclusive of boiler ash and scrap metal but including organics and chloride in wastewater, indicates a cumulative load to date of 13,500,000 pounds. During the same period, the plant consumed 31,400,000 pounds of raw materials. A high ratio of waste/raw material seems to be characteristic of the silicones industry.

2. Optimization of neutralization, incineration, and landfill operations has led to improved efficiencies based on cost analysis. With existing facilities, we are doing about as good as we can with minimum adverse effects on the environment. Exclusive of neutralization, the cost of treating the various plant wastes ranges from $5 to $20 per ton.

3. Further studies on properties and characterization of aqueous plant wastes indicate that flocculation and flotation as well as sedimentation merit consideration for wastewater clarification.

A rental pilot plant clarifier capable of evaluating all three approaches will be set up at Sistersville in August to obtain the necessary design data.

4. Studies by the EP-R/D group at the Tech Center indicate Sistersville Plant aqueous organic wastes to be readily biodegradeable. Further work is planned to determine which of the possible biological treatment routes is most feasible. This will include screening investigations of trickling filters, activated sludge, Unox, and extended aeration systems. Other bench studies indicated that activated carbon treatment would be uneconomical.

The main parameter now is organic waste load variability. Hour to hour variations in the past have ranged as high as 10/1. The Plant EP group is now investigating day to day variations based on composite samples. Recent samples (April to July 1971) indicate that 100% of the daily composites had TCA values of 600 ppm or less, whereas grab samples over a similar period had 98.9% the TCA values less than 1000 ppm.

When additional data become available, these will be published in the form of a probability graph.

Facilities Expansion and Engineering Projects

1. Design and construction of the sewer segregation project is proceeding on schedule with no major problems thus far. Most of the concrete for the clean sewer skimmer will be poured by 7/16/71.

The writer is preparing a letter of justification for three DOF changes on the sewer segregation project, as follows:

(a) Relocation of process sewer terminal manhole.

(b) Addition of a process sewer to collect wastes from the combined instrument/electrical maintenance building.

(c) Addition of a truck spot for the paper release building for transfer of bulk PPG and product.

2. The neutralization/clarification preliminary design is taking shape and proceeding reasonably close to schedule. The DOF will probably be released by September.

3. The required information for the proposed kiln incinerator PBD has been assembled. Mr. Campbell Skinner of Tech Center Engineering is preparing a PBD-type memo which will be circulated to interested parties in the near future.

4. Discussion with Mr. T. C. Hill, Plant EP, and Production have led to a decision to locate the copper-silicon sludge and tri-bucket treatment facilities north of the monomers methyl chloride tanks and across First Street.

This project will include containment and neutralization of silane sludges of all types. Recovery of copper concentrates for reuse or sale is being deferred for a year or two.

Waste Effluent Monitoring

1. Wastewater chloride and organic loads were up significantly in June as plant production activity increased (see attached graph).

2. Monitoring activities for the Industrial Hygiene Task Force project continued. Particulate levels at Monomers were surveyed. Comparison of the Hi-Vol unit to the MSA unit with impinger indicates greater accuracy with the former, mainly because of the much larger air sample that is taken. The MSA unit, however, has greater utility for local emission problems because it can be attached directly to personnel.

3. Work is progressing on developing a process environmental impact evaluation sheet for Sistersville Plant processes. The objective is to compile efficiently in one summary sufficient information to indicate the probable effects of the product and its wastes on the air, soil, and water environments, and to indicate the economic aspects of treating the wastes in relation to product value.

C W Shonnard

CWShonnard:ksh
Attachment

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July 13, 1971

CRA
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OPERATIONS IMPROVEMENT AND ENVIRONMENTAL PROTECTION

Month of June, 1971 - J. F. Brammer

Operations Improvement

A total of 34 new proposals were approved this month for an estimated recurring savings of $96,200. Non-recurring amounted to $4,300 for the same period. Proposals accepted were from 14 hourly and 25 salary.

A total of 56 proposals were reported as implemented for a recurring savings of $103,200. The plant achievement now stands at $900,400 or 65% of our annual goal of $1,375,000.

Lewis Holmes won the $25.00 Savings Bond for June.

Writer attended a Group I OIP conference in Bound Brook this month. Main emphasis was on motivating more participation in program.

Environmental Protection

Neutralization by lime slurry this month consisted of 200,100 lbs. chlorosilanes, 7,400 lbs. of CNE lites, 10,000 lbs. of HCL from cyclic and stripper units. Average Cl content of chlorosilanes was 53% this month.

The continuous neutralizer was used only twice this month due to some mechanical problems with instrumentation and low amount of silanes to run.

Addition of lime slurry to the acid sewer continued this month on an intermittent basis as plant dumped excess acid. System works good except for having to unplug auto metering valve almost every time unit is turned off and restarted. We believe a minor repiping and water flush will solve problem.

Solvents incineration amounted to 638,800 lbs. this month. No major problems were encountered. The new type nozzle used in E-22 has worn to point of replacement. This is a relatively inexpensive part and has given very good service over types used in the past.

Dumpster material for incineration load was slightly down this month but handling of EDA, A-1100/CNE heavies gave no significant problems.

Open Pit Incinerator unit was down only two days this month for repairs to refractory. Doors are in very bad shape and replacement is scheduled for July shutdown. Drummed waste incineration continued through the gunk system to OPI this month with no major problems.

Drum Operation consisted of handling plant input of 226 drums and small backlog of oddball emulsions. Pt content was slightly higher at avg. of 250 ppm.

Platinum recovery amounted to 18 drums of ash this month. We are preparing to ship approximately 450 drums of incinerate ash in July to a salvage dealer.

Scrap metal operation this month consisted of $700 from drum sales and shipment of six loads of tin to Cremer.

Water - A total of 219 MM gallons were pumped with 4 pumps in service all month.

Engineering Projects

1. OPI doors will be installed in July with completion week of 12th.

2. Chlorosilane tank in Monomers is finished except for sprinkler system.

3. Liner and top replacement for T-50-U is still in OVPE with price and materials of construction being evaluated.

4. Ranney well No. 4 tie-in line is being prepared for use when well is ready.

OIP

Five new OIP's were received this month and implementation brings U/EP achievement to $26,500 year to date or 36% of our annual goal.

EP Personnel

1. One SIR and 5 UCR's were received this month.

2. Forty-two hours overtime was worked, 24 for vacation coverage, 10 for holdover after 12 midnight, and 6 for training.

3. Two training sessions were held with men this month.

J. F. Brammer

JFBrammer:ksh

Attachments

JUNE 1971

	M Lbs. This Mo.	M Lbs. YTD	Treatment	Unit	Remarks
Chlorosilanes	200	1,090	Neutralized	T-50 + CN	HCl fuming
A-1100 Hvys	27	90	Incinerated	E-22 + 500	Heavy white smoke
CNE Hvys	5	118	Incinerated	E-22 + 500	Heavy white smoke
EDA/HCl	20	176	Incinerated	E-22	Occ. white smoke
Solvent Mix (T-53-U)	389	2,471	Incinerated	E-22,500,523	Lt. blue smoke
Acid Solvents	12	96	Incinerated	E-22	White smoke
CNE Lites (Polymers)	7	54	Neutralized	T-50	Sweet odor in area
A-187 Hvys	---	16	---	---	---
A-162 Lites	---	7	---	---	---
A-1620 Lites	14	38	Incinerated		
Acid Toluene (35-J)	231	646	Incinerated	E-22,500	Generally no smoke
A-174 Lites	---	25	---	---	---
GCPT	---	126	---	---	---
Y-4398 Lites/Hvys	---	25	---	---	---
A-1100/CNE Lites (Monomers)	5	47	Incinerated	E-22	White smoke
Amyl Lites	---	6	---	---	---
Others	18	77	Incinerated	E-22,500	
Spent Mass	23	88	Neutralized	Quench Pond	
CuSi Sludge	245	1,177	Neutralized	Quench Pond	
Lime Sludge	600	900	LF		
Boiler Ash	1,100	10,666	LF		
OPI Ash	66	305	LF		
Depoly	5	49	LF	Trench	Heavy white fog and fuming
Trash	73	446	Incinerated	OPI	Some dark smoke
Filter Cake	86	387	Incinerated	OPI	Some dark smoke
HCl (Acid Sewer)	20	50	Neutralized	Pond	
Pt Filter Cake	19	154	Inc./stg.	Slag Pot/Hill	Blue smoke
Lab Samples	11	60	Incinerated	OPI	Heavy mushroom dark smoke
Ni Filter Cake	---	---	---	---	---
Pt Liquid	6	163	Incinerated	Slag Pot	Some dark smoke
Cans (1 and 5)	2	13	Incinerated	OPI	Some dark smoke
Drums to Pond	3	30	Neutralized	Pond	
Gunk Drums	74	216	Incinerated	OPI	
Solid Drums	3	417	LF	Trench 8B	
Pourable Drums	22	258	LF	Trench 8B	
Tk. Mix Drums	---	43	---	---	
Total - M Lbs.	3,212	20,738			

JUNE 1971

Unit	Ser. Factor	M Lbs. Processed	Opr. Hrs.	Mtce. Hrs.	$/Lb. Opr. Cost This Mo.	$/Lb. Opr. Cost YTD	$/Lb. Mtce. Cost This Mo.	$/Lb. Mtce. Cost YTD
E-22	69%	385	130	8	.0016	.0016	.0002	.0008
Pt/Ni Recovery	6%	16	30	6	.010	.0083	.003	.003
E-500	68%	335	126	8	.002	.0013	.0003	.0008
E-523	8%	36	6	6	.001	.0007	.002	.0013
OPI	34%	244	120	40	.0015	.0027	.0016	.0037
Gunk St.	25%	74	123	24	.008	.007	.003	.003
Tk. Drums	---	---	---	---	---	---	---	---
T-50-U	10%	200	50	10	.0023	.0017	.0005	.0002
CN Tube	2%	10	4	20	.002		.02	.0054
CN-AS	5%	20	10	4	---	---	---	---
Dump Truck	45%	522	230	30	.002	.0024	.0006	.0008
Fork Lift	15%	110	72	20	.003	.0052	.002	.003
Landfill	5%	25	24	---	.006	.006	---	---

Lime Used M/Lb.: This Month 130 YTD 847

Lime Cost/Lb. HCl: $ .0134 YTD $ .013
Neutralized

Actual Ratio Lime Used - This Month 1.03 YTD 1.17
/Lb. HCl Neutralized

JUNE 1971

DRUMMED WASTE HANDLING

	Rec'd from Plant	Avg./Day	Sampled	Processed	Backlog	Manhours to Operation
Month of June	226	7.5	0	*347	(121)	173
YTD	1655	9.0	324	3341	38	1379

* Pond 6
LF 81
PT 15
Gunk 245

DRUMMED WASTE RECEIVED

This Month	YTD
79,100	537,200

METAL SALVAGE

		Rec'd from Plant	$ Cost Plt. Hauling	$ Cost Sort + Load	$ Freight Cost	$ Sales	$ Net Income
Tin	This Month	6,000 lbs.	$ 40	$ 60	$ 210	$ ---	$(310)
	YTD	62,830 lbs.	$ 280	$ 210	$ 740	$ 219	$(621)
Hvy Metal	This Month	18,000 lbs.	$ 60	$ 50	---	---	$(110)
	YTD	68,000 lbs.	$ 260	$ 330	---	$ 736	$ 146
Mt Drums	This Month	No. Sold 1,540	---	---	---	$ 500	$ 500
	YTD	8,989	---	---	---	$ 5808	$5808

METAL SOLD - LBS.

	Tin	Hvy	Cu-Brass
This Month	---	---	---
YTD	82,120	84,620	---

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UTILITIES MONTHLY REPORT

June, 1971 - D. J. Dowling

Plant Air

Elliott compressor was taken out of service June 6 due to pressure surging. Trouble was in third stage. Rental Joy compressors were utilized during the outage of the Elliott. The third stage was repaired and the Elliott was returned to service. The bearings supporting the fan in the Niagara cooler failed and the Elliott was shut down June 19 and 20 to install new fan bearings. These bearings are fastened to the metal housing walls and better support appears needed. On June 22 the Elliott failed on startup. Impellers, diffusers, spindles and their bearings were replaced in the three stages. The cause of failure was a broken check valve in the third stage discharge line of the Elliott which on startup permitted the compressor and main oil pump to turn backward draining the bearings of oil. It is imperative that this compressor not turn backward. The Elliott was repaired and returned to service on July 1.

The after cooler serving the reciprocating air compressors was cleaned on air side with high pressure water on June 18.

Water Treatment

A connection was made at Powerhouse to permit Polymers I Department to use filtered lime-soda treated water instead of condensed steam to dilute caustic for the cyclic system. The savings is $8000 per year.

The resin and anthrafilt were replaced in the No. 2 and No. 3 zeolite softeners of the No. 2 Graver system with new materials. The brine distributor pipe had broken off in the No. 3 softener. The No. 3 filter was recharged with anthrafilt due to accumulation of solids from No. 2 Graver on top of the bed. No. 1 and No. 2 filters contained solids but much less than No. 3 filter. The manheads were replaced with new ones on the filters and softeners because of excess corrosion occurring on the manheads under the insulation.

Steam

Work by Union Boiler continued on repair of crack in steam drum of No. 3 boiler per procedure approved by state and insurance company.

The sequence of work was as follows:

(a) Removed 80 tubes to gain access to outside of cracked ligament.
(b) Cut out sample section across crack in weld on outside of drum. Sample sent to Mr. G. Elder, Tech Center for examination. A sample from inside of drum had previously been examined.
(c) Ground out U shaped groove to middle of drum wall from inside and outside drum to remove crack. Dye tested to be sure no crack remained.
(d) Welded groove simultaneously from inside and outside of drum using previously qualified welders.
(e) Tested weld using Xray by Pittsburgh Testing Company and ultrasonic by Mr. B. Clark, Tech Center.
(f) Heat treated the circumferential weld around center of drum utilizing electric heating elements which received energy from 8 welding machines. Work was done by Mr. J. Rich of Heat Engineering. The weld was stress relieved to temperature of 1200°F for 3 hours.
(g) Retested the new weld with Xray and ultrasonic. No flows were discovered.
(h) Replaced 12 tubes by end of month.

Nitrogen

The dispatching service for Linde trucks was relocated at Cleveland instead of Pittsburgh.

Conversion of No. 4 Boiler

The preliminary engineering was completed by Mr. T. C. Hill on providing capability on No. 4 boiler to burn fuel oil in addition to gas. Temporary storage of No. 2 diesel oil fuel will be provided and burner design from Mr. W. E. James, UCC Tech Center is planned. A budget request for $20,000 will be submitted.

Overtime	Hours
Holiday	16
Vacation	64
Extra workload	4
Absentee	8
	92

Utilities Summary	
Coal Usage	4,678 M lbs.
Steam generated coal	43,837 M lbs.
Steam generated gas	24,004 M lbs.
Natural gas purchased	50,485 MCF
Pipeline nitrogen	31,014 MCF
Liquid nitrogen for R and D	2,412 MCF
Air compressed	78,858 MCF
Water pumped	219,000 M gal.
Power purchased	5,562 MKWH

Project Activity - EP Department

1. Refractory Repair in OPI

New ash discharging doors will be installed in July.

2. Chemical Landfill

Preliminary drawings of the core boring work have been made by the Tech Center. The total depth and water level of the core boring holes were determined on July 2. Nearly all holes contained some water, however, there had been heavy rain in the past two days.

3. Skimmer for SCR

A floating boom was requisitioned for use across Sugar Camp Run. It will be made of urethane floats and vinyl coated nylon fabric fin. The floating saucer pump ordered for the sewer separation project will be used for skimming floatables.

4. Incinerator Project

The following heat of combustion analyses were determined on representative solid wastes. The determinations were made in a bomb calorimeter at the Special Problems Laboratory of the Institute Plant and are expressed as high heat value in BTU/lb.

Aged lime sludge 2,536	K1275 7,948
Filter sludge 6,318	174 Hvs 12,151
Filter cake 9,050	Pt filter cake 6,015
W988 gum 11,055	Depoly res. 16,217

Safety Activity

The Major Hazard Survey of the Utilities operations was continued during June.

The DOF on converting boilers to oil from coal was reviewed and comments submitted to Mr. W. R. Goff Jr., project manager.

D J Dowling

DJDowling:ksh

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ENVIRONMENTAL PROTECTION

Month of June, 1971 - D. H. Ott

Sewer Separation

1. Underground concrete thrust blocking on utility water lines was an interference problem as construction began on two new process sewer manholes in the Monomers Intermediates area. As a precaution against recurrence of this problem, all underground sewer construction drawings have been reviewed, and no further interference with underground utility lines is anticipated.

2. Alarm settings have been determined for the various water quality parameters to be monitored within the production areas and sewer outfalls. These alarms are necessary to alert plant personnel to hazardous or unusual concentrations of contaminants.

Neutralization and Clarification

1. Operation of the continuous neutralizer at low flow rates of water (< 10 gpm) when neutralizing methyl lites continued. Concentration of the resulting sludge was lower accompanied by less fuming and heat evolution than in previously reported runs. Lower chloride content accounted for these differences pointing out variability in the waste material.

2. Sand filtration studies on continuously neutralized chlorosilanes (methyl lites) have begun. Two experiments were completed using a 2' x 2' x 2' plexiglas box containing a 2" gravel bed covered with 3-1/2" of sand. The results are summarized below.

   (a) Experiment 1 - Approximately 20 gallons of neutralized chlorosilane sludge (collected two days previous) were poured intermittently on the sand filter. Drain rates were found to fall off rather quickly as fine settleable type particles collected on the surface of the sand. The effluent was found to be clear and essentially free of suspended material. Influent pH was 10 while the effluent pH was 8. Table 1 shows the change in drain rate for the duration of the test. Table 2 shows the increase in solids concentration of the filtered sludge over a two day period.

TABLE 1: Drain Rates of Sand Filtered Chlorosilane Sludge

Test Duration (Min.)	Amount of Filtered Material (Gal.)	Effluent Drain Rate GPH/Ft^2
1	4	3.85
7	8	1.95
10	8	1.32
13	11	1.23
20	14	0.95
33	18	0.79
47	19	0.66
66	19	0.58

TABLE 2: Solid Concentration of Filtered Chlorosilane Sludge

Period (Hrs)	% Solids (Wt)
Initial	17.1
1/2	20.8
1	22.1
3	23.1
24	24.9
48	25.8*

* Bulk Density = 47.4 lbs/Ft^3

(b) Experiment 2 - Approximately 50 gallons of neutralized chlorosilane sludge were poured onto the sand bed filter immediately after passing out of the continuous neutralizer. This sludge was hot having a consistency of "shaving cream". Sludge level in the sand filter was allowed to vary from one to fourteen inches. Drain rates remained fairly constant at 1.2 GPH/Ft^2 during addition of the material, but fell off to 0.6 GPH/Ft^2 after two hours. Solids concentration varied from an initial 18% to 22% after three days.

3. Preparation has begun for the installation of the pilot plant flocculator and clarifier to be in operation near the end of July. A shop order has been submitted to repair one Vanton type sampling pump. A second shop order has been submitted to relocate the 55 gallon sample drums and support rack from the storm sewer sampling shanty to the site of the pilot clarifier. These drums will function as a neutralizer for acid sewer waste water which will subsequently be pumped to the clarifier.

Projects

1. Initial drafting work has been started on a new sewer identification and numbering system. When complete, the entire plant sewer system (including new sewers) will be updated on reference drawings. Essentially the system will identify all plant sewers as to (a) sewer opening (b) zone (c) area within zone (d) destination, i.e. process, clean, or sanitary sewer and (e) identification number.

   It is believed that this method of sewer identification will provide easy monitoring, reference, and location of plant sewers.

2. Test evaluation of the Moyno utility pump (Model FS-11-E) as a sewer sampling pump has shown some encouraging results although further testing is required. The pump operated continuously over a two week period, pumping at a rate of two to five gpm with a suction lift of about thirteen feet. The air driven unit was operated in the Monomers storm sewer at MH 43 C. The pump has not functioned as a self-priming device although it is designed to have that capability. The effect of abrasive materials on the rotor and stator must be determined.

General

1. One 55-gallon drum of wastewater, three parts acid sewer influent to one part storm sewer was sent to the Charleston Technical Center for evaluation.

2. Determination of underground water levels in the proposed new chemical landfill area has begun.

3. Installation of the steam ejector sampling unit has been delayed.

D. H. Ott

DHOtt:ksh